Molecular orbitals.

Quote by: **http://en.wikipedia.org/wiki/Molecular_orbital**
In chemistry, a molecular orbital (or MO) is a mathematical function describing the wave-like behavior of an electron in a molecule. This function can be used to calculate chemical and physical properties such as the probability of finding an electron in any specific region. The term orbital was introduced by Robert S. Mulliken in 1932 as an abbreviation for one-electron orbital wave function.[1] At an elementary level it is used to describe the region of space in which the function has a significant amplitude. Molecular orbitals are usually constructed by combining atomic orbitals or hybrid orbitals from each atom of the molecule, or other molecular orbitals from groups of atoms. They can be quantitatively calculated using the Hartree–Fock or self-consistent field (SCF) methods.

I find that molecular orbitals either are inside the molecule or outside of it. this means, the molecule is being held together from the inside or the outside. if it is being held together from the inside, then the other molecules won't be held together with it, and it will be a 'free molecule.' of course, this means molecular bonding will look something like water compared to wood, no?

So, the only thing really about this is that outside orbitals will bond with others and form something more like wood than water, of course. this means that the orbitals should connect on the inside - to keep it solid at that level, and try to double the orbitals on the outside for something solid. this would lead to stronger metals or solids. of course, if you want to make gold a fluid, for example, all you need to do is get rid of the orbitals on the outside of the gold. this can be done by adding protons or anti electrons or something, yes?

But, in science today, it is all about making stronger things, so you would want to add orbitals on the outside of the molecule. this will lead to the molecule being more 'social' with other elements, and, this will lead to stronger plastics, parts for engines, etcetera etcetera.

Now, to make it easy to add or remove orbitals, inside or out, you need to add silicon or sand - silicon being sand without the oxygen. if you want to make it stronger, you need to add a metal or equivalent element. this will make it stronger or weaker.

Of course, you might want to study the molecular orbital more? if that is the case, then you need to observe that each molecule has a few elements or atoms making it up, and the more there is in there, the bigger it will be. this also means that there are only said amount of electrons available to it, so, the more atoms there are in each molecule, the less stable it will be, as, there are a set amount of molecular orbitals for each molecule, depending on how many orbitals there are for the atom.

This sounds like a trip down memory lane to me! this is so easy... don't you think? if the orbitals were to come into contact with anti electrons, there will be more holding it together, so, the more there is to a molecule - the more orbitals it has - the stronger the substance will be from the point of looking at it as a gas, liquid or solid.

Quote by: **http://en.wikipedia.org/wiki/Molecular_orbital**

Bonding, antibonding, and nonbonding MOs[edit]
When atomic orbitals interact, the resulting molecular orbital can be of three types: bonding, antibonding, or nonbonding.

Bonding MOs:

Bonding interactions between atomic orbitals are constructive (in-phase) interactions.
Bonding MOs are lower in energy than the atomic orbitals that combine to produce them.
Antibonding MOs:

Antibonding interactions between atomic orbitals are destructive (out-of-phase) interactions, with a nodal plane where the wavefunction of the antibonding orbital is zero between the two interacting atoms
Antibonding MOs are higher in energy than the atomic orbitals that combine to produce them.
Nonbonding MOs:

Nonbonding MOs are the result of no interaction between atomic orbitals because of lack of compatible symmetries.
Nonbonding MOs will have the same energy as the atomic orbitals of one of the atoms in the molecule.

So, we have anti bonding, bonding and non bonding. this is like solid liquid or gas, as, the anti bonding is like thin air, the non bonding is like fluid, and the bonding is like solids.

Covalent bonds.

Quote by: **http://en.wikipedia.org/wiki/Covalent_bond**
A covalent bond is a chemical bond that involves the sharing of electron pairs between atoms. The stable balance of attractive and repulsive forces between atoms when they share electrons is known as covalent bonding.[1] For many molecules, the sharing of electrons allows each atom to attain the equivalent of a full outer shell, corresponding to a stable electronic configuration.

Covalent bonding includes many kinds of interactions, including σ-bonding, π-bonding, metal-to-metal bonding, agostic interactions, and three-center two-electron bonds.[2][3] The term covalent bond dates from 1939.[4] The prefix co- means jointly, associated in action, partnered to a lesser degree, etc.; thus a "co-valent bond", in essence, means that the atoms share "valence", such as is discussed in valence bond theory. In the molecule H2, the hydrogen atoms share the two electrons via covalent bonding.[5] Covalency is greatest between atoms of similar electronegativities. Thus, covalent bonding does not necessarily require that the two atoms be of the same elements, only that they be of comparable electronegativity. Covalent bonding that entails sharing of electrons over more than two atoms is said to be delocalized.

Put briefly, this is about similar electron clouds being brought to each other so that they bond. if the elements are similar they will have the same electro bonding values and be bonded. this also means gases might not bond due to for example the ozone layer where there is a lot o3, because they have different 'charges.'

So, having the same amount of orbitals will influence the bonding more than being of the same type of element, being gas, liquid and solids. this is like oil spills, where they do not bond, because, if they bonded, the water would absorb all the oil and we would have only water.

Now, when it comes to delocalized bonding, then they make up fractions of equal to the same amount of orbitals. this means that many hydrogen atoms could bond to ozone, due to the amount of orbitals in the ozone.

Covalent radius.

Quote by: **http://en.wikipedia.org/wiki/Covalent_radius**

The covalent radius, rcov, is a measure of the size of an atom that forms part of one covalent bond. It is usually measured either in picometres (pm) or angstroms (Å), with 1 Å = 100 pm.

In principle, the sum of the two covalent radii should equal the covalent bond length between two atoms, R(AB) = r(A) + r(B). Moreover, different radii can be introduced for single, double and triple bonds (r1, r2 and r3 below), in a purely operational sense. These relationships are certainly not exact because the size of an atom is not constant but depends on its chemical environment. For heteroatomic A–B bonds, ionic terms may enter. Often the polar covalent bonds are shorter than would be expected on the basis of the sum of covalent radii. Tabulated values of covalent radii are either average or idealized values, which nevertheless show a certain transferability between different situations, that makes them useful.

The bond lengths R(AB) are measured by X-ray diffraction (more rarely, neutron diffraction on molecular crystals). Rotational spectroscopy can also give extremely accurate values of bond lengths. For homonuclear A–A bonds, Linus Pauling took the covalent radius to be half the single-bond length in the element, e.g. R(H–H, in H2) = 74.14 pm so rcov(H) = 37.07 pm: in practice, it is usual to obtain an average value from a variety of covalent compounds, although the difference is usually small. Sanderson has published a recent set of non-polar covalent radii for the main-group elements,[1] but the availability of large collections of bond lengths, which are more transferable, from the Cambridge Crystallographic Database[2][3] has rendered covalent radii obsolete in many situations.

This is tricky, you should see the table! it has hundreds of values for each atom, but let's try to find a pattern as we did before for maths and chemistry - which is much simpler sounding than actually doing it. let's give it a go!

I figure they need to fit into the square root of something else, as they all have different values. if they were to take their entry value, being their atomic number, we could see how many times they fit into say 500? but, that is a very vague way to say things, let's see if we can find their supposed value.

Let's say that hydrogen, which has an atomic number of 1, and helium which has an atomic number of 2 were to find a like divider? we are told that hydrogen has 35, and helium has a radius of 28. how could this work in a number theory? well, if it is 35 for one, it must be 35. let's say that 2 goes into 35 a little less, but goes into 28 twice, having a covalent radius of 2? this means that two goes into hydrogen's 35 twice, except that it is not complete, but goes in more than once? does that make sense? just round up to the next whole number as if it were that whole number?

Now, let's compare our hydrogen to the next element on the table, being [3] lithium with a value of 128. this means that 3 goes into 35 also twice, but then the value is 128? this is because it is the second 35, and 35 into 128 equals three times, equaling 3. this time you drop the left overs, so maybe you should always drop the left overs? let's look at the helium again? that has a value of 28 and number of 2, so, 35 times 2 equals 70, and 28 goes into 70 twice, being the atomic number? how's this look now?